Letters to the Editor.

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Light Produced by Rubbing Quartz Pebbles Together.

I HOPE that the letter from Lieut.-Comdr. Damant in NATURE of October 21 may induce some chemist to endeavour to ascertain the cause of the peculiar "empyreumatic" odour which accompanies the flashes of light produced by rubbing two quartz pebbles one against the other. My attention was first directed to the fact that the flashing could be obtained, as well when the pebbles are rubbed together submerged in a basin of water as in air, by the Rev. Reginald Gatty.

I have ascertained that careful chemical cleaning of the surface of the pebbles does not prevent the production of the peculiar smell—which might have been due to a deposit of organic matter from the sea—on pebbles picked up on the seashore. I also have ascertained that bits of quartz from inland quarries give out the peculiar smell when they are rubbed together so as to produce flashes of light, and the same smell accompanies the light production when large crystals of rock-crystal are used. Further, I found that the light flashes can be produced when the quartz or crystal is submerged in alcohol. Probably other liquids would not arrest it. Consequently it should be possible to obtain the volatile odoriferous matter in solution when produced and to subject it to chemical examination. It would not be difficult to devise a little mechanism for producing flashes of light by grinding two quartzite pebbles together beneath a small quantity of liquid for some minutes, or even hours, and so to obtain in the liquid such emanations from the triturated quartz as are soluble in suitable liquid reagents. (See pp. 60–61 of my "Diversions of a Naturalist," Methuen, 1915.)

E. RAY LANKESTER.

October 31.

Chemical Warfare, the Universities, and Scientific Workers.

I HAVE just received an invitation from the War Office "to become an associate member of the Committee now being constituted as part of the new peace organisation for chemical warfare research and experiment." The invitation was accompanied by what is stated to be the present list of associate members, containing more than sixty names well known in science. As it stands, this list is certainly a very powerful inducement to accept the invitation in the case of anyone content in this important matter to follow the lead of his more influential colleagues, for it comprises a very large proportion of the best known workers in the branch of science mainly involved. Unfortunately, however, it includes my own name, and I take it, therefore, that, in part at least, it is in reality a list of those to whom invitations are being issued rather than of those who have accepted the invitation.

The function of the Committee is stated to be "the development to the utmost extent of both the offensive and defensive aspects of chemical warfare." Its work is governed, as regards disclosures, by the terms of the Official Secrets Act, and every member of the Committee will be required to sign a statement that he has read the Act and is prepared to abide by its provisions. It is the intention to allocate, so far as practicable, research of a purely scientific nature in chemical warfare to universities and similar outside institutions.

Now, for my part, I think this is a very important matter which ought not to be left entirely to the personal choice of individuals, but should be most carefully considered by the universities and by scientific workers as corporate bodies. It was one thing for scientific men and the universities to be called upon in the stress of actual conflict to assist the fighting Services when they were forced by enemy action to protect themselves against, and in turn to develop, a mode of warfare until then proscribed by civilised nations, but it is surely quite another matter for them, in consequence, to be called upon without consultation to become a normal part of the peace organisation for developing it in secret, both in its offensive and defensive aspects, to the utmost possible extent.

I do not think there is any precedent for this departure. Universities train medical men indiscriminately for civil and military services, but the Army Medical Service is non-combatant, and is intended to ameliorate the horrors of war. Universities of late have recognised military subjects in their curricula for their diplomas, and lent their organisations for the purposes of what were in origin defensive military services, such as the Volunteer and Officers Training Corps.

Personally, I feel that universities and scientific men stand for something in the world higher than anything which has as yet found expression and representation in Governments, particularly in their international relations. In consequence, I fear that they will find themselves in a false position if they allow themselves by default to be depressed to the position of mere agents to develop this new and, as yet, still unlegalised mode of warfare. The uses likely to be made of their work are, in the present unsettled condition of the world, highly uncertain, except in so far as it is quite certain that the effective control over these uses is not the part in which they are invited to co-operate. No one can pretend that scientific organisations are strong enough to dictate, as in the case of the professional medical organisation, the purposes for which science shall be used in the community. My own individual view is against accepting this invitation until the question of the position of the universities and scientific men as corporate bodies, in the part of the organisation which they are not invited to join, has first been satisfactorily settled. I think the properly constituted unions of scientific workers should give the matter their consideration and lay down for the guidance of their members the conditions under which they should, if at all, accept the invitation. It would be most helpful to have the views of my colleagues, particularly of some of the sixty-four who are stated already to have joined the organisation as associate members, publicly expressed upon this very important matter.

FREDERICK SODDY.

British Laboratory and Scientific Glassware.

THE British glass industry is undoubtedly to be congratulated on attaining the excellent results described in Mr. Jenkinson's letter in NATURE of October 28, but I may venture to point out that it is little comfort to the user to know that good glass is made if no guidance is given him as to the particular brand referred to. Of the five samples tested it is true that the best was British, but the worst was also British. I gather from inquiries made that the faults complained of by laboratory workers are not so much defective resistance to alkalis, etc., but insufficient

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annealing and liability to break with changes of temperature. Table glass is well annealed, so that the defect in question is not insuperable, and a want of care in the manufacture is suggested. The increased loss by breakage has become a serious consideration in the running of practical classes since British glass has been in use. As pointed out in previous correspondence, the danger of restricting import lies in the lack of inducement to further improvement.

W. M. BAYLISS.

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THE points raised by Mr. Jenkinson in his letter on the subject of laboratory and scientific glassware published in NATURE of October 28 should direct the attention of users of such glassware to the quality of the British-made product as compared with other well-know Continental brands.

No single type of glass can be superior to all others for all purposes. One glass may be superior as regards attack by water and acids, but inferior in respect to attack by alkaline solutions. As it would obviously be highly inconvenient in practice for chemists to use different types of glass for different reactions, a general average must be taken, and a study of the papers in the Journal of the Society of Glass Technology referred to by Mr. Jenkinson will convince any unbiassed person that the quality of British laboratory glass has been proved fully equal, if not superior, to that of any other laboratory glass from whatever source it may have been obtained.

In the earlier days of the war complaints were frequently heard as to the finish of British-made articles. Either they were too thin, too thick, uneven, or the colour and shape were unsatisfactory, etc. Whilst these complaints were frequently justified, they were chiefly due to lack of experience. The blowing of laboratory glassware of the desired thickness and even throughout requires considerable experience on the part of the glass-blower, and blowers trained in this branch of the industry were not available. The glass used in the manufacture of laboratory ware is much harder (less fusible and with a shorter viscosity range) than that to which the blowers were accustomed, and this militated against the rapid acquirement of the technical skill necessary to produce the best class of ware.

The hardness of the glass and the undesirability of using fining agents such as arsenic and antimony rendered it very difficult to obtain the molten glass homogeneous and free from small gas-bubbles, and necessitated increased furnace temperatures during melting, thus calling for alterations in the design of furnaces in use or the erection of new furnaces of special type.

The colour of British laboratory glass is admittedly inferior to that of the best foreign glass. This is due to the purity of the materials used, particularly the sand. British sands can be obtained with nearly the same degree of freedom from iron as the best Continental sands, but not in considerable quantity or of constant quality. For special purposes, where freedom from colour is essential—*e.g.* Nessler cylinders—specially selected qualities of British sands may be used, or even imported sands, but from the general point of view of the chemical and scientific glassware industry it is absolutely essential that we should be able to produce highly efficient laboratory ware without recourse to the importation of any material from outside the Empire, and so far as possible with only British materials.

Further experiment and experience both with materials and melting operations will undoubtedly lead to improvement in the appearance of the product, and we claim that as British manufacturers, with the aid of British men of science, we have mastered the difficulties attendant on the production of the necessary quality of glass so successfully. They will, given fair opportunity, master the less essential, but nevertheless desirable, property of pleasing appearance.

Scientific apparatus, particularly lamp-blown apparatus, has received a considerable amount of attention from manufacturers and men of science interested in the technology of the glass industry.

It is a fact, unfortunately, that in pre-war days the best work of this class was done by German and Austrian lamp-workers. This work is now carried on largely in this country (to a considerable extent by disabled soldiers and sailors), and great progress has been, and continues to be, made. Research work on the most suitable types of glass tubing for lamp-working purposes has been carried out with very successful results (Journal of the Society of Glass Technology, 1917, vol. i., p. 61; 1918, vol. ii., pp. 90, 154).

Manufacturers have followed up suggestions for possible improvement, sometimes with success and sometimes otherwise, but generally associated with considerable trouble and expense, and we may fairly claim that great improvement has been achieved in this direction, and that few grounds for legitimate complaint remain on the score of the annealing of British-made laboratory ware.

A further and most important section calls for mention, namely, the production of graduated apparatus. To some extent this is a factory operation, but the production of accurate and trustworthy graduated apparatus calls in addition for the most highly skilled, careful, and experienced work and supervision. The work entailed is much greater than appears on the surface. Experimental work has been carried out at the National Physical Laboratory and at Sheffield University, and the testing department of the National Physical Laboratory has drawn up stringent regulations for the certifying of first-class graduated apparatus, so that such apparatus with the National Physical Laboratory certificate of accuracy can be relied upon to be quite as trustworthy as the well-known German apparatus with the Reichsanstalt certificate.

Complaints and unfavourable comparisons have frequently been made in connection with British laboratory ware, and very few expressions of appreciation or gratitude to those manufacturers who stepped into the breach to supply an absolutely indispensable article, knowing that their productions were far from perfect, but striving, with the help of the best scientific aid in the country, to improve the quality of their ware. Very great progress has been made, but under the abnormal conditions ruling at present in this country it is essential that stability should be assured for some time to come until the industry has had time to settle down from what is practically an experimental stage to normal working conditions.

Is it conceivable that the research work done by Sir Herbert Jackson, Prof. Turner, the National Physical Laboratory, and others, and the patient and frequently thankless efforts of manufacturers to render this country independent in such an essentially key industry, should be wasted; and that the valuable experience already gained should be lost on account of the flooding of the English market with Continental productions—made so easy by the present rate of exchange between England and Germany—and the consequent transference of our energies to less essential, but certainly more lucrative, directions?

FRANK WOOD.
(Wood Bros. Glass Co., Ltd.)

Borough Flint Glass Works, Barnsley,
November 2.

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